

WHAT IS CLAIMED IS:

1. A turbogenerator system, comprising:
 - a turbine;
 - a compressor;
 - a motor/generator;
 - a common shaft on which the turbine, compressor and motor/generator are mounted for rotation;
 - a primary combustor downstream of said compressor, said primary combustor having an exhaust gas outlet applied to the turbine to rotate the common shaft, the compressor and motor/generator;
 - a source of fuel for providing fuel to the primary combustor;
 - a catalytic reactor downstream of said turbine for reducing unburned hydrocarbons in said exhaust gases;
 - a recuperator for transferring heat from said exhaust gases to compressed gas applied by said compressor to said primary combustor;
 - a DC bus connected between said motor/generator and a load; and
 - a power controller for independently controlling the speed of said common shaft, an operating temperature of said turbogenerator and the voltage on said DC bus.
2. The turbogenerator system of claim 1 wherein said primary combustor is a flame combustor.
3. The turbogenerator system of claim 2 wherein said compressor compresses air which is applied, together with fuel from said source of fuel, to said primary combustor.
4. The turbogenerator system of claim 2 wherein said compressor receives from said source of fuel which is compressed together with air in said compressor to form a compressed air fuel mixture applied to said primary combustor.

5. The turbogenerator system of claim 1 wherein said primary combustor is a second catalytic reactor.

6. The turbogenerator system of claim 5 wherein said compressor compresses air which is applied, together with fuel from said source of fuel, to said primary combustor.

7. The turbogenerator system of claim 5 wherein said compressor receives from said source of fuel which is compressed together with air in said compressor to form a compressed air fuel mixture applied to said primary combustor.

8. The turbogenerator system of claim 2 wherein said power controller further comprises:

- a bi-directional generator power converter connected between said motor/generator and said DC bus for converting AC power from said motor/generator for application to said DC bus and for converting DC power from said DC bus for application to said motor/generator;

- a speed control loop responsive to a measured value related to a rotational speed of said common shaft and the turbine, compressor and motor/generator mounted thereon for controlling said rotation speed at a predetermined speed set point by operating said bi-directional generator power converter to apply power from said motor/generator to said DC bus and from said DC bus to said motor/generator.

9. The turbogenerator system of claim 8 wherein said speed control loop is responsive to a value of power applied to the load for determining said speed set point.

10. The turbogenerator system of claim 8 wherein said power controller further comprises:

a temperature control loop responsive to a measured operating temperature of said turbogenerator system for controlling said operating temperature to a predetermined temperature set point by controlling the flow of fuel from said fuel source to said primary combustor.

11. The turbogenerator of claim 10 wherein said temperature control loop is responsive to said rotational speed for determining said temperature set point.

12. The turbogenerator system of claim 10 wherein said power controller further comprises:

a bi-directional load power converter connected between said DC bus and said load for converting DC power from DC bus for application to said load and for converting power from said load to said DC bus;

a bus voltage control loop responsive to a measured value related to a voltage of said DC bus for controlling said voltage at a predetermined voltage set point by applying power from said DC bus to said load and from said load to said DC bus.

13. The turbogenerator system of claim 12 further comprising:

a dynamic brake resistor selectively applied by said bus voltage control loop to said DC bus to remove power therefrom.

14. The turbogenerator system of claim 13 further comprising:

an energy storage device; and

a bi-directional battery power converter responsive to said bus voltage control loop for selectively applying power from said energy storage device to said DC bus and from said DC bus to said energy storage device.